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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Yoshihisa USAMI, et al.

Appln. No.: 09/526,127

Confirmation No.: 9460

Filed: March 15, 2000

For: RECORDABLE DIGITAL VIDEO DISC

Docket No: Q58292

Group Art Unit: 1774

Examiner: L. Ferguson

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. A check for the statutory fee of $500.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: March 17, 2005

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For: RECORDABLE DIGITAL VIDEO DISC

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellants submit their appeal brief, as follows:

Table of Contents

I. REAL PARTY IN INTEREST

The real party in interest is Fuji Photo Film Co., Ltd., the assignee of the present application. The assignment was recorded on June 21, 2000.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' counsel, and the assignee of the application are not aware of any other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-20 are pending in the application. All of the claims are rejected. All of the claims (i.e., claims 1-20) are being appealed.

IV. STATUS OF AMENDMENTS

No amendment was filed subsequent to the final rejection.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 1 is a product claim, drawn to a recordable digital video disc. Page 6, lines 11-12, of the specification. The recordable digital video disc comprises a transparent disc substrate provided with a spiral pregroove having a depth of 100 to 200 nm and a half width of 100 to 450 nm. Page 5, lines 26-27; page 8, lines 6-13; paragraph bridging pages 8-9. The recordable digital video disc also comprises a recording dye layer placed in the pregroove. Page 9, lines 8-9; see also page 11, lines 5-7, describing plural recording dye layers). A light-reflecting layer is placed on the recording dye layer. Page 12, lines 28-30.

Claim 1 specifically requires the recording dye layer to have a thickness in the range of from 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance. Page 11, lines 8-13; and the paragraph bridging pages 11-12. According to Claim 1, the optical path[1] giving the first minimum reflectance is determined from a reflectance curve which is prepared using recordable digital video discs composed of the same disc substrate, the same recording dye layer having varying thicknesses, and the same light-reflecting layer. Page 11, lines 8-27.

Claims 2-4 depend from Claim 1. Claims 2-4 recite preferred thickness ranges of the recording dye layer. Specifically, Claim 2 requires the recording dye layer to have a thickness in the range of from 40% to 75% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11. Claim 3 requires the recording dye layer to have a thickness in the range of from 45% to 70% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11. Claim 4 requires the recording dye layer to have a thickness in the range of from 50% to 70% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11.

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[1] The optical path is calculated and represented by the product of the light-traveling length in the recording dye layer and the absolute refractive index (which depends on the employed dye) of the recording dye layer. Page 11, lines 20-23.

Claims 5-7 also depend from Claim 1. Claims 5-7 recite preferred thickness ranges of the recording dye layer. Specifically, Claim 5 requires the recording dye layer to have a thickness in the range of from 55 to 95 nm. Page 12, lines 11-14. Claim 6 requires the recording dye layer to have a thickness in the range of from 60 to 95 nm. Page 12, lines 11-14. Claim 7 requires the recording dye layer to have a thickness in the range of from 65 to 93 nm. Page 12, lines 11-14.

Claims 8-9 depend from Claim 1 as well. Claims 8-9 recite preferred structural characteristics of the pregroove. Specifically, Claim 8 requires the pregroove to have a depth of from 50 to 250 nm. Page 5, lines 26-27. Claim 9 requires the pregroove to have a half-width of from 100 to 450 nm. Page 5, lines 28-30.

Claim 10 depends from Claim 1 also. Claim 10 is a method claim, drawn to a method of recording information which comprises irradiating a recordable digital video disc of Claim 1 with a laser beam having a wavelength of 600 to 700 nm. Page 16, lines 1-10.

Independent Claim 11 is a product claim, drawn to a recordable digital video disc. Paragraph bridging pages 4-5. The recordable digital video disc comprises a transparent disc substrate, or a pair of transparent disc substrates, provided with a spiral pregroove having a depth of 100 to 200 nm and a half width of 100 to 450 nm. Page 5, lines 26-27; and paragraph bridging pages 4-5. The recordable digital video disc also comprises a recording dye layer placed in the pregroove on which information is recorded by irradiation with a laser beam, see page 9, lines 8-9, and a light-reflecting layer. Page 12, lines 28-30. The layers are in a specific order of a transparent disc substrate, a recording dye layer, a light-reflecting layer and a disc substrate. Page 4, lines 25-36. Alternatively, the layers can be in a specific order comprising a pair of transparent disc substrates provided with a pregroove, a recording dye layer placed in the pregroove, and a light-reflecting layer, arranged in order, where the recording dye layers are placed between the transparent disc substrates. Page 4, lines 25-36, and page 14, lines 7-11.

Like Claim 1, Claim 11 specifically requires the recording dye layer to have a thickness in the range of from 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance. Page 11, lines 8-13; and paragraph bridging pages 11-12. According to Claim 11, the optical path giving the first minimum reflectance is determined from a reflectance curve which is prepared using recordable digital video discs composed of the same disc substrate, the same recording dye layer having varying thickness, and the same light-reflecting layer. Page 11, lines 8-27.

Claims 12-14 depend from Claim 11. Like Claims 2-4, Claims 12-14 recite preferred thickness ranges of the recording dye layer. Specifically, Claim 12 requires the recording dye layer to have a thickness in the range of from 40% to 75% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11. Claim 13 requires the recording dye layer to have a thickness in the range of from 45% to 70% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11. Claim 14 requires the recording dye layer to have a thickness in the range of from 50% to 70% of the thickness corresponding to an optical path which gives the first minimum reflectance. Page 12, lines 7-11.

Claims 15-17 depend from Claim 11. Like Claims 5-7, Claims 15-17 recite preferred thickness ranges of the recording dye layer. Specifically, Claim 15 requires the recording dye layer to have a thickness in the range of from 55 to 95 nm. Page 12, lines 11-14. Claim 16 requires the recording dye layer to have a thickness in the range of from 60 to 95 nm. Page 12, lines 11-14. Claim 17 requires the recording dye layer to have a thickness in the range of from 65 to 93 nm. Page 12, lines 11-14.

Claims 18-19 depend from Claim 11. Like Claims 8-9, Claims 18-19 recite preferred structural characteristics of the pregroove. Specifically, Claim 18 requires the pregroove to have a depth of from 50 to 250 nm. Page 5, lines 26-27. Claim 19 requires the pregroove to have a half-width of from 100 to 450 nm. Page 5, lines 28-30.

Claim 20 depends from Claim 11. Like Claim 10, Claim 20 is a method claim, drawn to a method of recording information which comprises irradiating a recordable digital video disc of Claim 11 with a laser beam having a wavelength of from 600 to 700 nm. Page 16, lines 1-10.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issue presented for review is whether the Examiner erred in rejecting Claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over Raychaudhuri et al. (EP 0747895 A2) in view of Hurditch et al. (U.S. Patent No. 5,952,073).

VII. ARGUMENT

The Rejection

Claims 1-20 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Raychaudhuri et al. (EP 0747895 A2) ("Raychaudhuri") in view of Hurditch et al. (U.S. Patent No. 5,952,073) ("Hurditch").

A. There is no motivation to combine the teachings of Raychaudhuri with Hurditch to support the §103 rejection of independent Claims 1 and 11 and their dependent claims.

Raychaudhuri discloses a recordable optical element, particularly recordable compact discs, having a substrate, a recording layer and a light reflecting layer, where the recording layer has a material with the formula $Te_aGe_bC_cH_dO_e$; and where the reflecting layer and the recording layer are selected such that the element R_{max} or R_{min} (element reflectivity) is about or greater than 70% at about 780 nm. See Abstract and page 1, lines 10-11. Fig. 1 of Raychaudhuri refers to a typical plot of the reflectivity versus the thickness of a conventional optical recording element resulting from the light interference effect, where R_{min} is about 50% at about 780 nm. Fig. 3 is a plot of reflectivity versus thickness of one optical recording element in accordance with Raychaudhuri's invention using at least two sublayers of different compositions, where R_{min} is about or greater than 70% at about 780 nm.

The Examiner states that Raychaudhuri teaches the storing and reproducing of digital information within a compact disc having a recording layer and a first minimum in reflectance. The Examiner further states that Raychaudhuri discloses a substrate having a recording layer and light reflecting layer with the thickness of the recording layer and the reflecting layer being selected such that the R_{min} reflectivity (first minimum reflectance) is greater than 70% for a laser

wavelength of about 780 nm. See Final Office Action, mailed September 17, 2004, page 2, paragraph 3.[2]

The Examiner concedes that Raychaudhuri fails to teach a recordable disc having a half-width of the pregroove, thickness percentage of the recording layer and the laser wavelength, and then asserts that these properties could be easily determined by one of ordinary skill in the art, as a result of routine experimentation. See Non-Final Office Action, mailed August 7, 2003, page 3, lines 9-22.

The Examiner also concedes that Raychaudhuri fails to teach a spiral pregroove with a depth or the recording layer containing a dye, and then cites Hurditch to correct this deficiency. Hurditch discloses a dye composition for use in optical recording media such as recordable compact disc (CD-R) media and recordable digital video disc (DVD-R) optical media comprising at least one cyanine dye having an anion as disclosed in the Abstract, and preferably dissolved in ethyl lactate. See Abstract and col. 1, lines 16-20.

The Examiner contends it would be obvious to incorporate the dye from the recording layer of Hurditch into Raychaudhuri since dyes in grooves are known and have the capability of increasing photostability in optical recording layers. Additionally, the Examiner contends that it would be obvious to include the spiral pregroove with a depth of 100-250 nm in the transparent substrate of Raychaudhuri since Hurditch shows that this is a commonly used depth within the art. Additionally, the Examiner contends that the depth of the spiral pregroove is an optimizable

[2] The Final Office Action cites to reasons previously stated in the Non-Final Office Action, mailed ...(footnote continued)

feature of the recording layer. See Non-Final Office Action, mailed August 7, 2003, page 4, lines 1-18.

Appellants submit that there is no motivation to combine Raychaudhuri and Hurditch found in the references themselves. Indeed, Raychaudhuri clearly teaches away from using organic dyes in its embodiments which use a metal oxide layer, as discussed below.

The Examiner's proffered reason to use the dye from the recording layer of Hurditch in the optical recording element of Raychaudhuri is to provide increasing photostability in Raychaudhuri's optical recording layer. See Non-Final Office Action, mailed August 7, 2003, Page 4, lines 11-13. However, Raychaudhuri teaches away from using organic dyes in its embodiments as it clearly describes that using organic dyes in recordable elements can be undesirable due to their wavelength sensitivity. See page 2, lines 51-56. Accordingly, there is no reason why one skilled in the art would include the dye from the recording layer of Hurditch in Raychaudhuri for the purpose of increasing photostability when Raychaudhuri specifically teaches away from using organic dyes due to wavelength sensitivity. Appellants submit that the Examiner is improperly applying hindsight construction in maintaining the rejection of the claims when the references teach away from their combination with each other at a fundamental level. In other words, Raychaudhuri and Hurditch utilize completely different recording (or absorbing) layers. Therefore, Appellants submit that there is no suggestion nor motivation to

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August 7, 2003, at page 2, paragraph 4.

combine Raychaudhuri and Hurditch. Nor is it clear that the invention of Raychaudhuri could even be modified to utilize such a dye recording layer of Hurditch.

Furthermore, Appellants point out that the absorbing layer (recording layer) of Raychaudhuri is disclosed to be a metal oxide layer (Abstract), which is known to have a relatively low sensitivity. Thus, Raychaudhuri apparently chooses the metal oxide layer over other compositions, including the use of an organic dye, which would not necessarily provide the benefits and results attributable to Raychaudhuri's invention.

Because the combination of Raychaudhuri and Hurditch is inappropriate for at least the above reasons, Appellants request withdrawal of the rejections of independent claims 1 and 11. The remaining claims are patentable at least based on their dependency from claims 1 and 11.

B. The combination of Raychaudhuri and Hurditch does not teach a recording dye layer having a thickness in the range of from 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance. (Claims 1 and 11).

The claimed range of thicknesses for the recording dye layer is 40% to 90% of a thickness corresponding to an optical path[3] which gives the first minimum reflectance, or R_{min}.. Appellants' Figure shows that the claimed range of thicknesses for the recording dye layer is 40% to 90% of a thickness corresponding to an optical path which gives R_{min1}, where R_{min1} gives a reflectance of approximately 50%. The concept of the proposed thickness of Appellants'

[3] The optical path is calculated and represented by the product of the light-traveling length in the recording dye layer and the absolute refractive index (which depends on the employed dye) of the recording dye layer. Page 11, lines 20-23.

invention is illustrated in Appellants' Figure by the cross-hatched area under the reflectance curve.

The Examiner appears to have misapplied Raychaudhuri as addressing this aspect of claims 1 and 11 in the rejection. Appellants submit that because Raychaudhuri teaches an absorbing layer having a thickness outside of Appellants' claimed range of thicknesses, Raychaudhuri's disclosure actually teaches away from Appellants' claimed invention.

The Raychaudhuri's invention resides in the following characteristic features (Raychaudhuri, page 3, lines 11-13):

a) The optical recording layer has at least two sublayers of different compositions; and

b) The thickness of the optical recording layer and the reflecting layer are selected such that the R_{min} reflectivity (first minimum reflectance) is about or greater than 70% for a laser wavelength of about 780 nm.

Appellants note that the thickness of the optical recording layer and the reflecting layer of Raychaudhuri are selected not such that the thickness is greater than 70% of the thickness showing the R_{min} reflectivity (first minimum reflectance), but such that the R_{min} reflectivity (first minimum reflectance) is about or greater than 70% for a laser wavelength of about 780 nm.

Apparently, Raychaudhuri has succeeded in enhancing the R_{min} reflectivity (first minimum reflectance) from approximately 50% (see Raychaudhuri, Fig. 1) to 70% or greater by

employing the optical recording layer having at least two sublayers of different compositions (see Fig. 3). This is the characteristic feature of Raychaudhuri's invention.

However, Raychaudhuri specifically addresses the incompatibility of using absorbing layers having very small thicknesses that are less than the thickness corresponding to R_{min}. Raychaudhuri discloses that "one of the most important format requirements is the background reflectivity which is specified to be greater than 70% at about 780 nm." Page 2, lines 18-19. Raychaudhuri emphasizes that "[i]n particular, it has been difficult to produce recordable elements that will meet the > 70% reflectivity requirement." Page 2, lines 32-33.

The following section taken from Raychaudhuri clearly teaches away from the present invention by teaching a particular range of thicknesses for conventionally known absorbing layers, equal to or greater than the thickness corresponding to R_{min}, and for Raychaudhuri's absorbing layer, at or near R_{min}:

> "***When an absorbing layer of very small thickness (much less than that corresponding to R_{min}) is used, the reflectivity is high, but such structure is not useful for recording purposes because of low thermal efficiency***. The reflective layer is a very effective heat sink.... It is generally observed that the smallest useful thickness is that which produces reflectivity in the neighborhood of the first minimum reflectance. ***To produce useful recording elements, therefore, requires materials which will produce > 70% reflectance with thickness larger than this***

> ***minimum useful thickness***.... Thus, generally speaking, materials that are appropriate for conventional recording structure are not appropriate for recordable CD structure, and vice versa." (emphasis added). Page 2, lines 37-48; referring to Fig. 1.

The meaning of the above-cited description is easily understood by referring to Fig. 1 (prior art) of Raychaudhuri. Although the reflectance is higher if the thickness is much smaller than the thickness showing the R_{min} reflectivity (first minimum reflectance), Raychaudhuri describes that structures having absorbing layers with very small thicknesses are ***not*** useful for recording purposes because of low thermal efficiency.

Raychaudhuri further states in the Detailed Description of the Invention:

> "With optical elements, the thickness is generally selected to be at R_{max}, although it has been found that, ***in accordance with the invention, the thickness can also be at or near R_{min}***." Page 3, lines 41-32.

As Raychaudhuri teaches a thickness range for an absorbing layer at or greater than R_{min}, Raychaudhuri actually teaches away from the present invention, which claims a thickness in the range of 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance.

In contrast to Raychaudhuri, the recording layer of Appellants' recordable disc is a dye layer having a thickness in the range of from 40% to 90% of a thickness corresponding to an

optical path which gives the first minimum reflectance. The concept of the proposed thicknesses of Appellants' invention is illustrated in Appellants' Figure by the cross-hatched area under the reflectance curve.

Thus, the present invention is not rendered obvious by Raychaudhuri alone or in combination with Hurditch, as Hurditch does not correct this deficiency. Therefore, claims 1 and 11 are patentable for at least this reason.

Thus, even if the cited references are combined, it is respectfully submitted that it would not have been obvious to one of ordinary skill in the art to select Applicants' claimed recordable digital video disc, groove characteristics and reflectance and recording dye layer characteristics.

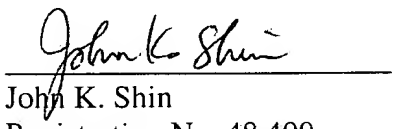
For the above reasons, it is respectfully submitted that the subject matter of claims 1-20 is neither taught by nor made obvious from the disclosures of Raychaudhuri and Hurditch, and it is requested that the rejection under 35 U.S.C. §103(a) be reconsidered and withdrawn.

Claims 2-10 and 12-20 are patentable over Raychaudhuri in view of Hurditch at least based on their dependency from claims 1 and 11.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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CLAIMS APPENDIX

CLAIMS 1-20 ON APPEAL:

1. (previously presented): A recordable digital video disc comprising a transparent disc substrate provided with a spiral pregroove having a depth of 100 to 200 nm and a half width of 100 to 450 nm, a recording dye layer placed in the pregroove on which information is recorded by irradiation with a laser beam, and a light-reflecting layer, arranged in order, wherein the recording dye layer has a thickness in the range of 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance, the optical path giving the first minimum reflectance being determined from a reflectance curve which is prepared using recordable digital video discs composed of the same disc substrate, the same recording dye layer having varying thickness, and the same light-reflecting layer.

2. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness in the range of 40% to 75% of the thickness corresponding to an optical path which gives the first minimum reflectance.

3. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness in the range of 45% to 70% of a thickness corresponding to an optical path which gives the first minimum

4. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness in the range of 50% to 70% of a thickness corresponding to an optical path which gives the first minimum reflectance.

5. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness of 55 to 95 nm.

6. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness of 60 to 95 nm.

7. (original): The recordable digital video disc of claim 1, wherein the recording dye layer has a thickness of 65 to 93 nm.

8. (original): The recordable digital video disc of claim 1, wherein the pregroove has a depth of 50 to 250 nm.

9. (original): The recordable digital video disc of claim 1, wherein the pregroove has a halfl-width of 100 to 450 nm.

10. (original): A method of recording information which comprises irradiating a recordable digital video disc of claim 1 with a laser beam having a wavelength of 600 to 700 nm.

11. (previously presented): A recordable digital video disc comprising a transparent disc substrate provided with a spiral pregroove having a depth of 100 to 200 nm and a half width of 100 to 450 nm, a recording dye layer placed in the pregroove on which information is recorded by irradiation with a laser beam, a light-reflecting layer, and a disc substrate, arranged in order, or comprising a pair of transparent disc substrates provided with a spiral pregroove, a recording dye layer placed in the pregroove on which information is recorded by irradiation with a laser beam, and a light-reflecting layer, arranged in order, said recording dye layers being placed

between the transparent disc substrates, wherein each of the recording dye layers has a thickness in the range of 40% to 90% of a thickness corresponding to an optical path which gives the first minimum reflectance, the optical path giving the first minimum reflectance being determined from a reflectance curve which is prepared using recordable digital video discs composed of the same disc substrate, the same recording dye layer having varying thickness, and the same light-reflecting layer.

12. (original): The recordable digital video disc of claim 11, wherein each of the recording dye layers has a thickness in the range of 40% to 75% of the thickness corresponding to an optical path which gives the first minimum reflectance.

13. (original): The recordable digital video disc of claim 11, wherein the recording dye layer has a thickness in the range of 45% to 70% of a thickness corresponding to an optical path which gives the first minimum reflectance.

14. (original): The recordable digital video disc to claim 11, wherein the recording dye layer has a thickness in the range 50% to 70% of a thickness corresponding to an optical path which gives the first minimum reflectance.

15. (original): The recordable digital video disc of claim 11, wherein each of the recording dye layers has a thickness of 55 to 95 nm.

16. (original): The recordable digital video disc of claim 11, wherein the recording dye layer has a thickness of 60 to 95 nm.

17. (original): The recordable digital video disc of claim 11, wherein the recording dye layer has a thickness of 65 to 93 nm.

18. (original): The recordable digital video disc of claim 11, wherein the pregroove has a depth of 50 to 250 nm.

19. (original): The recordable digital video disc of claim 11, wherein the pregroove has a half-width of 100 to 450 nm.

20. (original): A method of recording information which comprises irradiating a recordable digital video disc of claim 11 with a laser beam having a wavelength of 600 to 700 nm.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

NONE

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

NONE